

REMARKS

In the Action, claims 2, 5-7 and 9-18 are rejected. In response, claims 2 and 5 are amended, and claims 13-18 are cancelled.

Claims 2 and 5 are amended to recite the color coating containing 0.1 to 1.0 parts by weight polyvinyl alcohol as disclosed on page 8, line 28, of the specification. Claims 2 and 5 are also amended to recite the gate roll coater having an applicator roll, an inner roll and an outer roll where the peripheral speed ratio of the inner roll and the outer roll to the applicator roll is 50-95%. These features are found in claims 17 and 18, which are now cancelled. In view of these amendments and the following comments, reconsideration and allowance are requested.

Rejection Under 35 U.S.C. § 112

The claims are rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement. The Action objects to the claims for reciting the use of a gate roll coater.

Appended hereto are pages 192 and 193 from the Japan Technical Association of the Pulp and Paper Industry disclosing various types of coating devices. For example, a Massey coater has 6 rolls that include an applicator roller on one side of the paper as shown in Figure 4.30. A gate roll coater as shown in Figure 4.34 includes an applicator roll, an inner roll and an outer roll on one side of the paper. A West Virginia coater shown in Figure 4.32 and the Champion machine coater shown in Figure 4.33 include different numbers of rollers in comparison to the gate roll coater. The KCM coater of Figure 4.31 includes three rolls on one side of the paper, while the gate roll includes an applicator roll, an inner gate roll and an outer gate roll. The KCM coater includes an applicator roll, a distribution roll and a metering roll, where each of the rolls has a different size.

As described in the specification, the transfer roll coater of the invention comprises an applicator roll, an inner roll and an outer roll as defined by a specific speed ratio of the rolls. Thus, it would be clear to a person of ordinary skill in the art that the transfer roll coater defined by the applicator roll, inner roll and outer roll as described in the specification and the Examples of the present application is a gate roll coater.

In view of the above comments, the knowledge of one skilled in the art and the specification, Applicants submit that the claimed gate roll coater is supported by the specification as filed. Moreover, independent claims 2 and 5 as amended specifically define the gate roll coater as having an applicator roll, an inner roll and an outer roll defined by a specific peripheral speed ratio of the inner roll and the outer roll to the applicator roll. Accordingly, Applicants submit the claims are supported by the specification as originally filed.

The Rejections

The claims are rejected under 35 U.S.C. § 103 as being obvious over U.S. Patent No. 6,197,155 to Wurster et al. in view of U.S. Patent No. 5,972,167 to Hayasaka et al. or JP 11-050392 and U.S. Patent No. 5,030,325 to Saji et al. in view of U.S. Patent No. 4,154,899 to Hershey et al. and Hayasaka et al. Claims 16 and 18 are rejected over Wurster et al. in view of Hayasaka et al. and JP '392.

The combination of the cited patents does not disclose or suggest a method of producing a coated paper for offset printing, gravure printing or web offset printing by applying a coating color using a gate roll coater having an applicator roll, an inner roll and an outer roll where the peripheral speed ratio of the inner roll and the outer roll to the applicator roll is 50 to 95% and where the coating color contains 0.1 to 1.0 parts by weight polyvinyl

alcohol with a coating speed of 1100 m/min or more with a coating weight per side of 7 g/m² or more as in independent claims 2 and 5.

As disclosed in the specification, the invention is directed to a method of applying a coating color to a paper at high speeds at a specified coating weight, while reducing the boiling and misting properties that commonly occur in the conventional coating processes. Typically, it is difficult to increase the speed of the coating device to 1000 m/min or higher since the coating compositions exhibit misting and boiling, thereby reducing the efficiency of the coating applicator. The invention is directed to a coating method that is able to inhibit the occurrence of boiling and misting during high speed coating, and particularly to a method using coating speeds of 1100 m/min or higher. The art of record does not disclose or suggest these features of the invention.

The prior methods experience difficulty in obtaining coatings at high coating weight while also maintaining the high speed of the coating apparatus. Thus, the prior methods typically sacrifice the coating weight for the high speed or exhibit significant misting and boiling in order to obtain the high coating weights.

Applicants developed a method for applying a coating color using a coating color containing 0.1 to 1.0 parts by weight polyvinyl alcohol based on 100 parts by weight of the pigment at a coating weight of 7 g/m² or more using a gate roll coater including a transfer roll, an inner roll and an outer roll at a coating speed of 1100 m/min or higher and where the peripheral speed of the inner roller and the outer roller to the applicator roller is 50 to 95%. This provides a transfer of the coating color from the applicator roller of the film transfer coating system to a base paper at a high coating weight while maintaining the desired operating characteristics of the coating system. The resulting coated paper has excellent web offset printability, blister resistance and gravure aptitude. These features are not disclosed or suggested in the combination of the cited patents.

Wurster et al. is directed to coating a web printing paper with cold-set suitability to improve gloss and ink aptitude for the cold-set inks. Wurster et al. provides a lightweight coated web recording paper having a specific value for water penetration and ink absorption. Wurster et al. defines the gloss values of the resulting paper in the range of 40-50% having a specifically defined smoothness for use in cold-set printing.

Wurster et al. discloses the film transfer coating system being a Massey coater and a meter size press. Wurster et al. provides no suggestion of a gate roll coater or a transfer roll coater having an applicator roll, an inner roll and an outer roll with the peripheral speed ratio as in the claimed invention. Wurster et al. does not disclose the type of coating system used in the Example or the properties of the coating obtained by various coating systems. Wurster et al. is directed to a recoating paper developed primarily for newspaper cold-set inks. There is no suggestion of a paper suitable for a web offset printing, gravure printing or web offset printing paper as in the present invention.

Wurster et al. further fails to disclose the coating system capable of applying the coating color at a coating weight of 7 g/m² or more at a coating speed of 1100 m/min or higher. The Action relies on the broad range of components generally disclosed in Wurster et al. However, when Wurster et al. is read as a whole, Wurster et al. does not disclose the coating color containing 0.1 parts by weight to 1.0 parts by weight polyvinyl alcohol as in claim 2 or the coating color comprising 0.1 to 1.0 parts by weight polyvinyl alcohol as an auxiliary and less than 2.0 parts by weight of starch as an adhesive based on 100 parts by weight of the pigment as in claim 5. In particular, the Examples of Wurster et al. disclose the binder containing 2 wt% polyvinyl alcohol.

The invention is directed to improving the coating properties of the coating system using a very small amount of polyvinyl alcohol in a manner that is not disclosed or suggested in Wurster et al. Furthermore, Wurster et al. does not suggest the improvement in blister

resistance for offset printing, a low ratio of missing dots in gravure printing, and the improved printability and coating properties as in the present invention.

Hayasaka et al. does not provide the motivation or suggestion to use a gate roll coater at the claimed coating speed and peripheral speed ratio. Thus, it would not have been obvious to modify the process of Wurster et al. according to the teachings of Hayasaka et al. Hayasaka et al. is directed to a method of forming a uniform coating surface using a transfer roll coating at high speed where the pigment and coatings have a specifically defined viscosity. The high speed coating of Hayasaka et al. provides a high gloss and smooth coated surface under low calendaring conditions to provide printability comparable to blade coating methods. Hayasaka et al. provides these results by specifying the concentration of the solid content, the density of the coating color and the use of a low viscosity starch based adhesive.

The Action refers generally to the coating speed disclosed in Hayasaka et al. However, Hayasaka et al. relies on the specific solid concentration, density of the coating color and the low viscosity starch adhesive to enable the coating speeds. Hayasaka et al. does not provide the blister resistance for offset printing, a low ratio of missing dots for gravure printing and the excellent printability of the present invention by incorporating 0.1 to 1.0 wt% of polyvinyl alcohol as claimed in combination with the coating speed of 1100 m/min or more at the claimed coating weight.

JP '392 discloses an offset printing coated paper which is different from the recording paper for newspaper cold-set inks of Wurster et al. Thus, the method of Wurster et al. and JP '392 are sufficiently different that it would not have been obvious to combine the teachings of the two patents. Even if Wurster et al. and JP '392 were combined, the combination does not disclose or suggest the claimed method for providing the desired properties such as inhibiting boiling and misting with a coating color containing a small amount of polyvinyl alcohol at a high coating speed of 1100 m/min or higher. A combination of JP '392 and

Wurster et al. would also not provide the enhanced blister resistance for offset printing, a low ratio of missing dots for gravure printing and the improved printability of the resulting coated paper of the claimed invention. The combination of Wurster et al., Hayasaka et al. and JP '392 do not suggest the coating color having a small amount of polyvinyl alcohol in an amount of 0.1 to 1.0 parts by weight at a high coating speed of 1100 m/min as claimed. Furthermore, a combination of the cited patents would not provide the enhanced blister resistance for offset printing, low ratio of missing dots for gravure printing and the improved printability as set forth in Examples 6, 9, 11 and 14 of the present specification. Accordingly, independent claims 2 and 5 are allowable over the art of record. The dependent claims are also allowable as depending from an allowable base claim.

The claims are also rejected over the combination of U.S. Patent No. 5,030,325 to Saji et al. in view of U.S. Patent No. 4,154,899 to Hershey et al. and Hayasaka et al. and JP '392. Saji et al. is cited for disclosing a method of producing coated paper using a coating composition that includes a pigment and an adhesive such as polyvinyl alcohol. Hershey et al. is cited for disclosing a method of producing a coated paper using a coating color containing a pigment, an adhesive, and polyvinyl alcohol. Hayasaka et al. and JP '392 are cited for disclosing transfer rollers having a specified coating speed.

The combination of the cited patents do not disclose or suggest the claimed method of producing a coated paper for offset printing or gravure printing where the color coating is applied by a gate roll coater having an applicator roll, an inner roll and an outer roll, where the peripheral speed ratio of the inner roll and the outer roll to the applicator roll is 50-95% and at a coating speed of 1100 m/min or more. Saji et al. and Hershey et al. refer generally to various coating devices but provide no suggestion of the claimed method or coating rolls or applying the coating color at the claimed coating speed of 1100 m/min or more.

The claimed invention provides a method for increasing the coating weight and the coating speed while maintaining the desirable transfer of the coating from the coating roller to the paper while providing the improved coating properties and reducing the undesirable effects of the prior coating compositions and coating speeds. As disclosed in the specification, the transferability of the coating color to the base paper is improved and provides excellent sheet gloss and density using a coating color containing 0.1 to 1.0 parts by weight polyvinyl alcohol as an auxiliary and not as the primary binder. Saji et al. and Hershey et al. do not disclose or suggest a coating color that enables the increased coating weight while maintaining good transferability from the coating roller to the paper. The invention is directed to the discovery that the coating weight of the coating color can be increased by the roll coating method to attain a coating weight on the paper in an amount of 7 g/m² or more without the disadvantages of boiling or misting as in the prior compositions.

In the present invention, the polyvinyl alcohol is used in combination with the adhesives to improve the transferability of the coating color from the transfer roll coater onto the base paper. The claimed amount of the polyvinyl alcohol increases the coating weight and maintains the coating efficiency while enabling the production of coated papers with improved printability for offset printing and gravure printing.

Saji et al. specifically discloses the use of polyvinyl alcohol as a conventional adhesive in conventional amounts. Saji et al. discloses the adhesive being an amount of 5 to 50 parts by weight based on 100 parts by weight of the pigment. Thus, Saji et al. specifically discloses the use of polyvinyl alcohol as an adhesive in an amount outside the claimed range. Saji et al. does not suggest the use of polyvinyl alcohol as an additive or auxiliary in conjunction with an adhesive. There is no suggestion of the claimed amounts of polyvinyl alcohol to improve the transferability of the coating from the coating roller to the paper to enable a coating weight of 7 g/m² or more.

Hershey et al. relates to a method of producing a coated paper for printing where the coating contains 1.5 parts by weight polyvinyl alcohol based on the weight of the pigment. Hershey et al. does not disclose or suggest the claimed method of applying a coating color by a gate roll coater at a coating speed of 1100 m/min or more. Furthermore, the amount of the polyvinyl alcohol of Hershey et al. is outside the claimed range. Thus, Hershey et al. provides no motivation or incentive to include polyvinyl alcohol in the claimed amounts in combination with the adhesives of Saji et al.

Saji et al. and Hershey et al. in combination do not suggest the claimed method of applying a coating color containing a pigment and an adhesive and 0.1 to 1.0 parts by weight polyvinyl alcohol and applying the coating color at the claimed coating speed to attain a coating weight of 7 g/m² or more. For the reasons discussed above, Hayasaka et al. and JP ‘392 provide no suggestion of the claimed coating speed and the use of the roll coater including an applicator roll, an inner roll and an outer roll, where the peripheral speed ratio of the inner roll and the outer roll to the applicator roll is 50 to 95% in combination with a coating color containing 0.1 to 1.0 parts by weight polyvinyl alcohol. Therefore, Hayasaka et al. and JP ‘392 provide no suggestion of modifying the process of Saji et al. and Hershey et al.

In view of the above comments, claims 2 and 5 are allowable over the art of record. The dependent claims are also allowable as depending from an allowable base claim.

In view of these amendments and the above comments, reconsideration and allowance are requested.

Respectfully submitted,



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